

## Accepted Manuscript

NURBS-enhanced maximum-entropy schemes

F. Greco, L. Coox, F. Maurin, W. Desmet

PII: S0045-7825(16)30763-0

DOI: <http://dx.doi.org/10.1016/j.cma.2016.12.024>

Reference: CMA 11270

To appear in: *Comput. Methods Appl. Mech. Engrg.*

Received date: 18 July 2016

Revised date: 11 December 2016

Accepted date: 15 December 2016

Please cite this article as: F. Greco, L. Coox, F. Maurin, W. Desmet, NURBS-enhanced maximum-entropy schemes, *Comput. Methods Appl. Mech. Engrg.* (2016), <http://dx.doi.org/10.1016/j.cma.2016.12.024>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



## NURBS-enhanced maximum-entropy schemes

F. Greco<sup>a,b,\*</sup>, L. Coox<sup>a,b</sup>, F. Maurin<sup>a,b</sup>, W. Desmet<sup>a,b</sup>

<sup>a</sup>*KU Leuven, Department of Mechanical Engineering, Division PMA, Celestijnenlaan  
300B - box 2420, B-3001 Leuven, Belgium.*

<sup>b</sup>*Member of Flanders Make.*

---

**Abstract**

In this paper, we combine high order local maximum-entropy schemes (HOLMES) with the integration framework developed in the NURBS-enhanced finite element method (NEFEM). We focus on the two-dimensional case where, given a domain described by some NURBS curves, a meshless formulation based on the HOLMES approximants is employed for the discretization and, at the same time, the geometric fidelity given by the NURBS boundary is preserved thanks to the NEFEM integration. Since HOLMES basis functions are not interpolatory on the boundary, different techniques are considered for the imposition of essential boundary conditions. The efficiency and the accuracy of the proposed methodology are confirmed with supportive numerical examples.

*Keywords:* maximum-entropy; meshless; high order; NURBS-enhanced FEM

---

**1. Introduction**

Several attempts have been made over the last few years to seek a tighter integration between Computer Aided Design (CAD) and numerical analysis, often referred to as CAE (Computer Aided Engineering). Two major contributions in this direction are represented by isogeometric analysis (IGA) [1, 2] and the NURBS-enhanced finite element method (NEFEM) [3, 4, 5].

The key idea of IGA is to employ the same basis functions of the CAD description also in the numerical analysis. In the original version of IGA, these basis functions are non uniform rational B-splines (NURBS) [6], which is the standard methodology employed in CAD systems. Unfortunately, the

---

\*Correspondence to: francesco.greco@kuleuven.be

Download English Version:

<https://daneshyari.com/en/article/4964119>

Download Persian Version:

<https://daneshyari.com/article/4964119>

[Daneshyari.com](https://daneshyari.com)